What is claimed is:

1. A process for regenerating a water softening system, said process of the type that removes multivalent ions from water, the water softening system including a softening tank through which the water to be softened passes from an upstream to a downstream end; a brine tank for holding a monovalent regenerating brine solution; a first diverter valve connected between the brine tank and the upstream end of the softening tank; a nanofilter, having upstream and downstream sides, for passing monovalent ions to the downstream side and retaining multivalent ions on the upstream side; a second diverter valve connecting between the downstream end of the softening tank and selectively to the upstream side of the brine tank; and, a connection between the downstream side of the nanofilter and the brine tank, said process comprising the steps of:

a) operating the first diverter valve to pass brine solution from the brine tank through the softening tank of the water softening system;

b) operating the second diverter valve to direct liquid from the downstream end of the softening tank to the brine tank;

c) directing unmodified liquid from the brine tank to the nanofilter;

d) directing the liquid on the downstream side of the nanofilter to the brine tank; and,

e) directing the liquid on the upstream side of the

nanofilter to a drain.

2. The process of claim 1, wherein the water softening system includes a pump receiving brine solution from the brine tank and supplying brine solution to the nanofilter, and including the step of powering the pump concurrently with operating the second diverter valve.

3. The process of claim 2, wherein the water softening system includes a third diverter valve receiving the brine solution from the second diverter valve, and the process includes the step of directing liquid from the second diverter valve away from the brine tank responsive to a predetermined condition.

4. The process of claim 2 wherein the water softening system includes a third diverter valve receiving the brine solution from the second diverter valve, and the process includes the steps of

a) testing the salinity concentration of the liquid from the downstream end of the softening tank; and

b) responsive to said salinity concentration above below a predetermined level, directing the liquid from the second diverter valve to the brine tank, and responsive to said salinity concentration below the predetermined level directing the liquid from the second diverter valve away from the brine tank.

5. The process of claim 2 wherein the water softening system includes a third diverter valve receiving the brine solution from the second diverter valve, and the process includes the steps of

a) timing from the start of the operating step for the second valve; and

b) responsive to said timing exceeding a predetermined time, directing fluid from the second diverter valve away from the brine tank.

6. The process of claim 2, including the step of directing the fluid from the brine tank, unmodified, to a nanofilter having a minimum of approximately 90% multivalent salts rejection and a maximum of approximately 20% monovalent salts rejection

7. The process of claim 6, wherein the water softening system includes a throttling valve connected to the upstream side of the nanofilter, and including the step of maintaining a higher pressure on the upstream side of the nanofilter than in the brine tank.

8. The process of claim 2, wherein the water softening system includes a throttling valve connected to the upstream side of the nanofilter, and including the step of maintaining a higher pressure on the upstream side of the nanofilter than in the brine tank.

9. The process of claim 1, including the step of maintaining the concentration of the brine in the brine tank above approximately 10%.